

(12) UK Patent Application (19) GB (11) 2 359 112 (13) A

(43) Date of A Publication 15.08.2001

(21) Application No 0101350.7

(22) Date of Filing 18.01.2001

(30) Priority Data

(31) 0003173

(32) 12.02.2000

(33) GB

(71) Applicant(s)

Smiths Group Plc
(Incorporated in the United Kingdom)
765 Finchley Road, LONDON, NW11 8DS,
United Kingdom

(72) Inventor(s)

Donald Richard Lacoy
Shannon Powers

(74) Agent and/or Address for Service

J.M. Flint
765 Finchley Road, London, NW11 8DS,
United Kingdom

(51) INT CL⁷

F16L 3/10

(52) UK CL (Edition S)

E2A AGH A372 A374 A417

(56) Documents Cited

GB 2128668 A

GB 1570820 A

GB 1396316 A

WO 99/49253 A1

CA 001255477 A

US 4202087 A

(58) Field of Search

UK CL (Edition S) E2A AGH

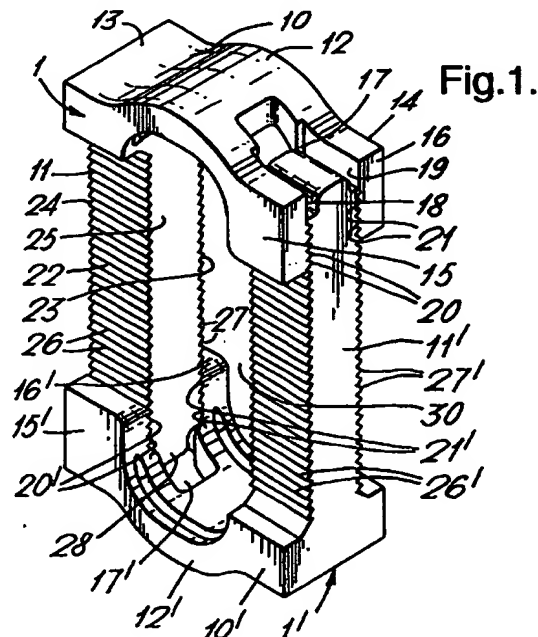
INT CL⁷ F16B 2/12, F16L 3/10

Online: WPI, PAJ, EPODOC;

(54) Abstract Title

Clamp for cables or the like

(57) A cable clamp has two identical moulded plastic components 1 and 1' that can be clamped together about a cable 40. Each component has a yoke 10, 10' with a ratchet bar 11, 11' at one end and two short arms 15 and 16 at its opposite end spaced by a gap 17 and having ratchet teeth 21, 21' on their inner faces 18 and 19. The yokes 10 and 10' can be squeezed together about the cable 40, causing the ratchet bars 11 and 11' to slide over the engaging teeth 21, 21', which prevents the two components 1 and 1' being subsequently separated. In another embodiment (fig 3) both ratchet bars are provided on one component and the ratchet teeth on the other. A housing for locating the article to be clamped can also be integrally formed with the clamp (fig 4).



1/3

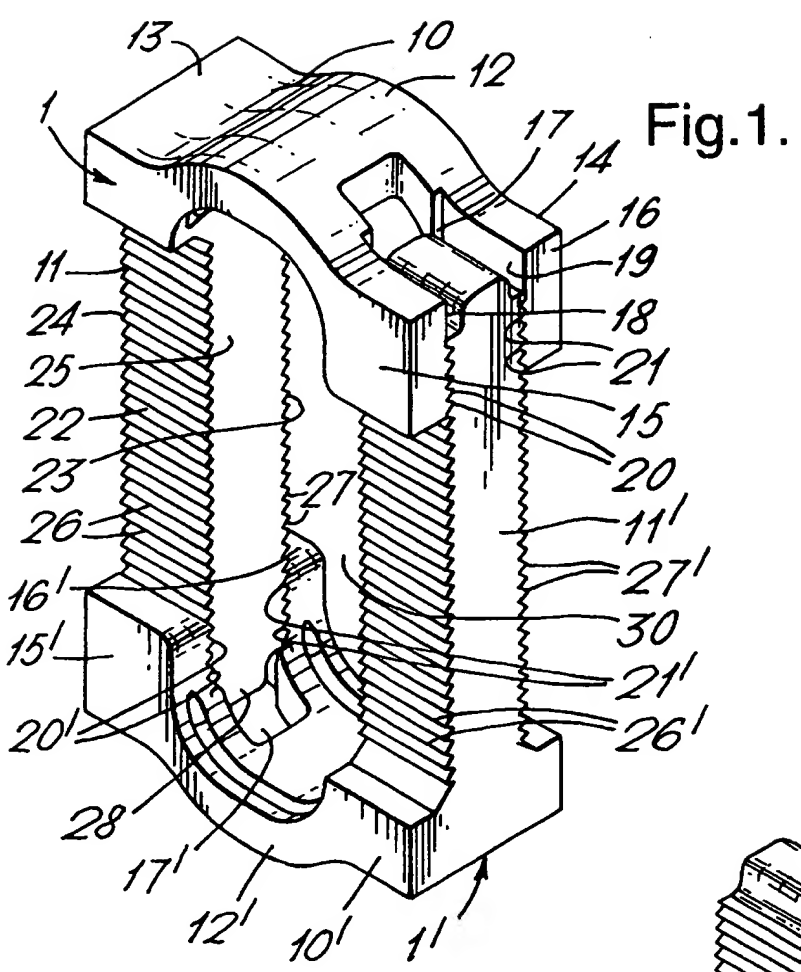


Fig. 2.

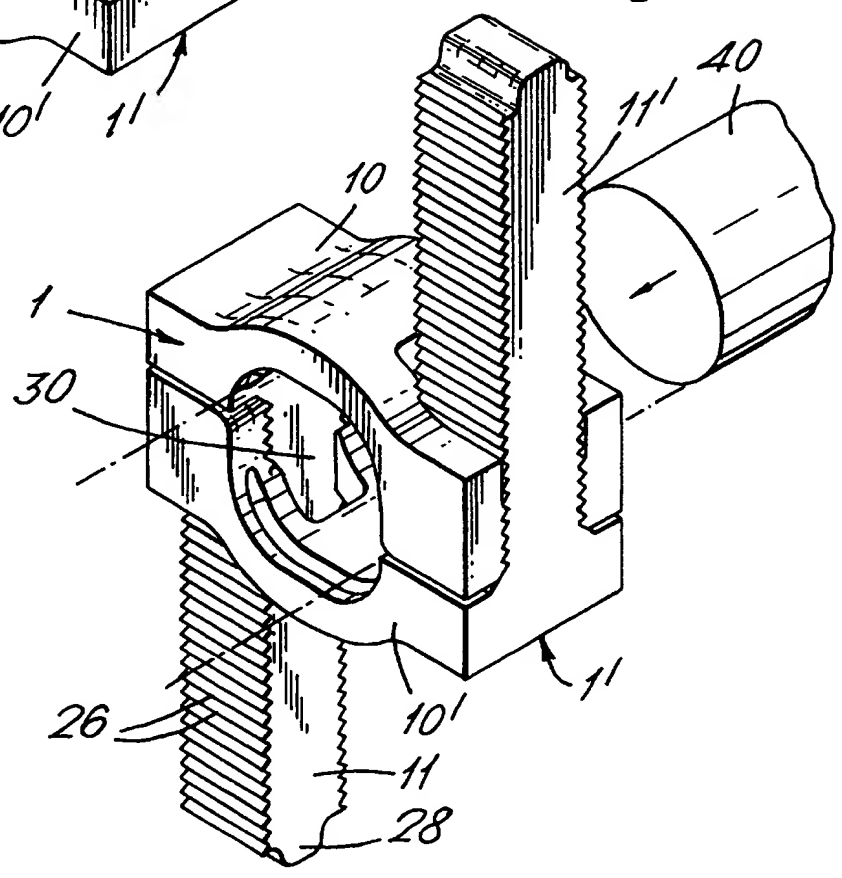


Fig.3.

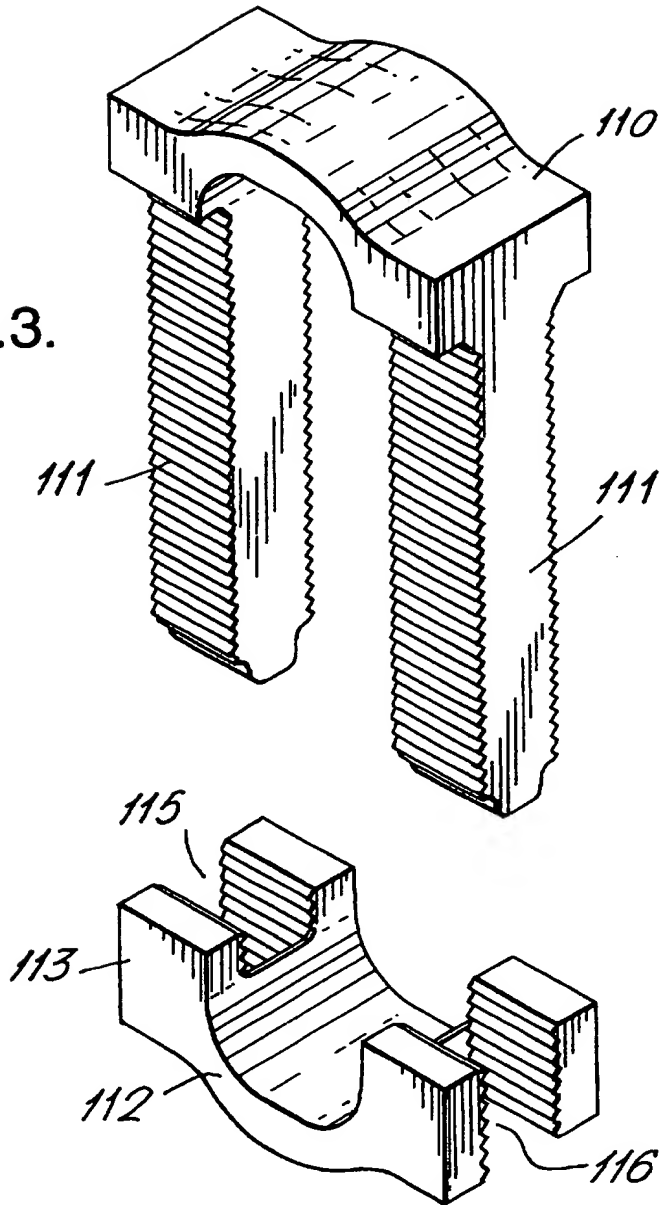
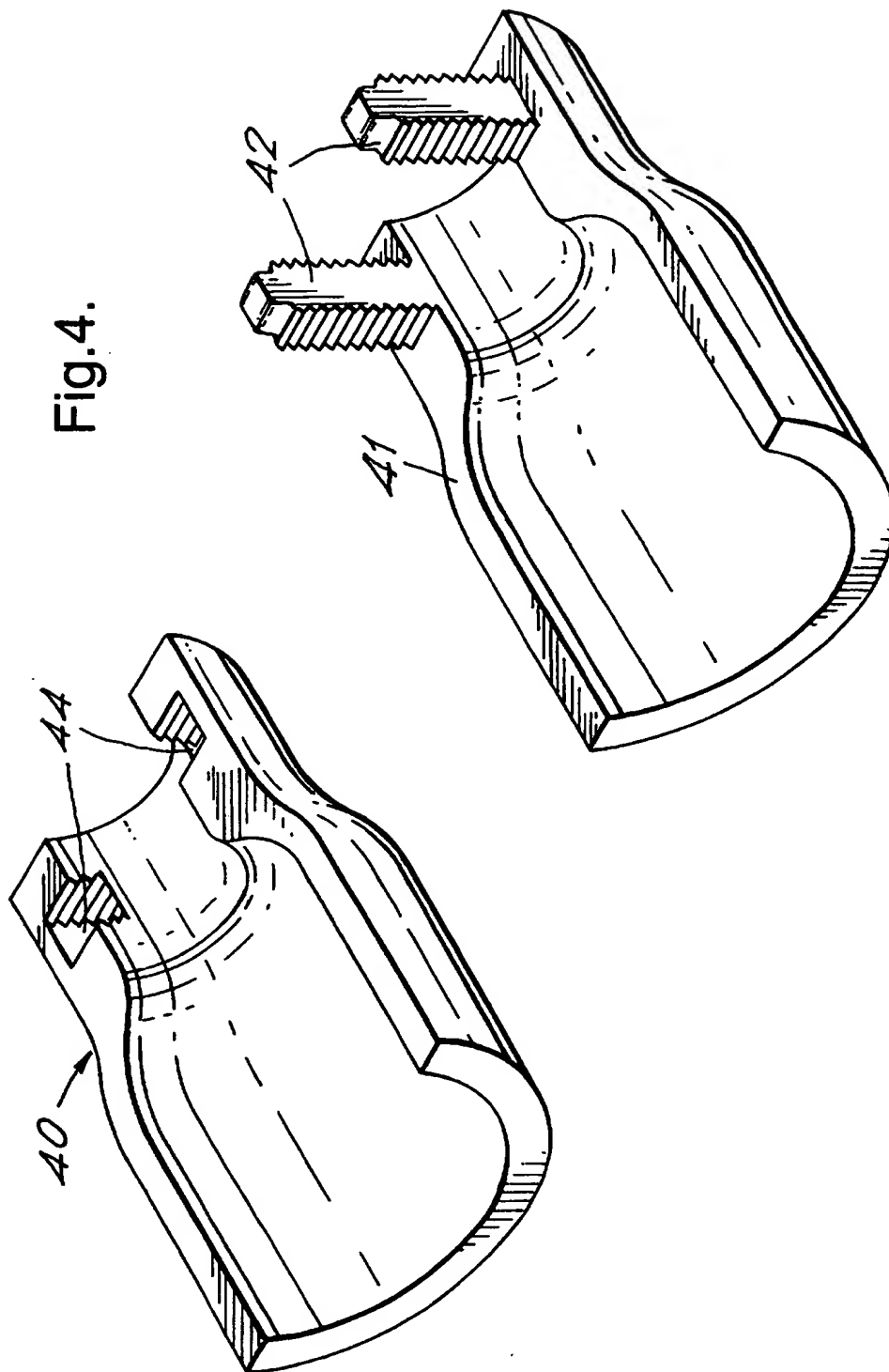


Fig.4.



CLAMPS

This invention relates to clamps.

The invention is more particularly concerned with clamps for cables, wires, hoses, ropes or the like.

Clamps are often used with bundles of cables, to keep them together or to help support the cables. Clamps are also used to lock onto cables where they extend in a housing, so that strain exerted on the cable is taken by the clamp and the housing rather than being transferred to an interconnection within the housing. The clamps can take various different forms. In one form, the clamp comprises a flexible strap with teeth along its length and having a ratchet integral with one end of the strap. The strap is wrapped around the cable or cables and the free end of the strap is threaded through the ratchet so that it can be tightened about the cable. It can be difficult to tighten this form of clamp because of the need to hold both the ratchet and the free end of the strap. Other forms of clamp are sold by Heyco Moulded Products, Inc of Kenilworth, New Jersey, USA under the trade marks "Hose Mates" and "Strap Mates". These are moulded in a generally circular shape and have engaging ratchet teeth that can be tightened by gripping between the nose of pliers. One disadvantage with this form of clamp is that any clamp can only be used with a relatively limited range of size of cables.

It is an object of the present invention to provide an alternative clamp.

According to one aspect of the present invention there is provided a clamp for fastening about an elongate member the clamp comprising first and second yokes that can be urged together about opposite sides of the elongate member, two generally parallel ratchet bars extending between the yokes, and cooperating ratchet teeth so that as the two yokes are moved together in one direction the two ratchet bars move over the ratchet teeth to restrain the yokes against separation in an opposite direction.

Each yoke is preferably formed integrally at one end with a respective ratchet bar and at its other end with ratchet teeth arranged to cooperate with the other ratchet bar. Each yoke and its respective ratchet bar is preferably identical with the other. The ratchet teeth are preferably provided on a surface between two arms of the yoke extending laterally of the clamp. The yokes and ratchet bars may be arranged such that they can be assembled or disassembled by relative movement laterally of the one direction. Each yoke preferably has an arched section for receiving the elongate member. Alternatively, one yoke may be provided with both ratchet bars, the other yoke being provided with two sets of cooperating ratchet teeth. The ratchet bars preferably have ratchet teeth on two opposite surfaces. The yokes and ratchet bars may be moulded from a plastics material. The clamp may be for clamping about one or more cables, the yokes being formed integral with cooperating housing parts of a connector.

According to another aspect of the present invention there is provided a clamp including first and second clamping members, first and second unidirectional sliders extending parallel to one another at right angles to the clamping members, and first and second locations on the clamping members arranged to receive respective ones of the sliders

in unidirectional engagement, the clamping members and sliders therebetween defining an aperture for receiving a member to be clamped.

A cable clamp according to the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of the clamp in a separated state;

Figure 2 is a perspective view of the clamp in a closed state;

Figure 3 is a perspective view of an alternative clamp; and

Figure 4 shows a clamp incorporated in a part of a connector.

With reference first to Figures 1 and 2, the cable clamp comprises two identical parts 1 and 1' moulded from a rigid plastics material. In the drawings, identical components of the two parts are given the same reference number one part having a prime ' added. Each part 1 and 1' comprises a clamping member or yoke 10, 10' and a unidirectional slider or ratchet bar 11, 11' integrally moulded with one another as a single piece. Because the two parts 1 and 1' are identical, only the construction of one part 1 will be described.

The yoke 10 is rectangular in section having a central upwardly-arched section 12 and two end sections 13 and 14. The left-hand end section 13 is plain and is joined with the ratchet bar 11. The opposite end section 14 is thickened so that it extends lower than the left-

hand end section and is bifurcated into two arms 15 and 16. The arms 15 and 16 extend parallel to the length of the yoke 10, that is, laterally of the clamp, and are spaced from one another by a gap 17, which defines a location in which the ratchet bars 11 and 11' are received. The inner face 18 and 19 of each arm 15 and 16, that is, the side facing the opposite arm, is moulded with a series of several parallel ratchet teeth 20 and 21 extending horizontally.

The ratchet bar 11 is narrower than the yoke 10 and extends downwardly at right angle from the left-hand end 13 of the yoke. The bar 11 has a rectangular section with two opposite side faces 22 and 23, which are wider than its end faces 24 and 25. Both side faces 22 and 23 are moulded along substantially their entire length with ratchet teeth 26 and 27 respectively. The teeth 26 and 27 extend horizontally, parallel to the length of the yoke 10. The end faces 24 and 25 are plain and smooth. The free end of the ratchet bar is reduced in thickness slightly to form a lead portion 28.

The two parts 1 and 1' are assembled with one another as a push fit, with the free end 28 of the ratchet bar 11 of the upper part 1 extending between the arms 15' and 16' of the yoke 10' of the lower part 1'. Similarly, the ratchet bar 11' of the lower part 1' extends upwardly between the arms 15 and 16 of the upper part 1. The teeth 20, 21, 20' and 21' on the arms 15, 16, 15' and 16' and the teeth 26, 27, 26' and 27' on the ratchet bars 11 and 11' are of cooperating shape so that they lock with one another enabling relative movement in one direction but not in the opposite direction. More especially, the teeth enable the two ratchet bars 11 and 11' to slide through the gap 17 and 17' between the arms of the opposite yoke 10 and 10' so as to reduce the separation between the two yokes from the position shown in

Figure 1 to the position shown in Figure 2 where the yokes abut one another. This thereby reduces the size of the aperture 30 between the two yokes 10 and 10' to a minimum. The ratchet teeth prevent the two parts 1 and 1' being separated in the opposite direction. Without any cable between the two parts 1 and 1', there is nothing to prevent them being pulled apart laterally, that is, parallel to the direction of the ratchet teeth, thereby disassembling the clamp. However, when tightened about a cable 40 or the like extending through the aperture 30, the cable will prevent the two yokes 10 and 10' being displaced laterally. The bars 11 and 11' could be arranged to enable their excess length to be broken off when the clamp is closed. This could be achieved by making the bars of a frangible material or by having several regions of reduced thickness spaced along the length of the bars to provide locations at which the bars can be broken.

In use, the clamp can be assembled onto a cable 40 by threading an end of the cable through the aperture 30 while the clamp is in an expanded state, as shown in Figure 1. Alternatively, where it is inconvenient to access an end of the cable, the clamp can be assembled on the cable by taking its two separate parts 1 and 1' and joining them together about the cable. The clamp is tightened initially by finger pressure and is then fully tightened by squeezing the two parts 1 and 1' together with pliers, by gripping the central arched portions 12 and 12' of the yokes 10 and 10' between the jaws of the pliers and squeezing them together. Once fully fastened in this way, the clamp can only be removed by cutting. If, however, a removable clamp is required, it could be made from a softer plastics that enables the yoke 10 to be bent when a ratchet arm 11 is pulled laterally out of the gap 17 between the two arms 15 and 16.

The clamp can be used on a relatively wide range of cable sizes compared with previous clamps because of the large range of sizes of the aperture 30. The clamp is easily assembled and can be used on cables where it is not possible to access an end for threading through the clamp. The clamp can be made readily at low cost.

The clamp is primarily intended for use in electrical connectors, to be fastened onto a cable within the connector housing close to entrance to the housing through which the cable extends. This helps relieve external strain applied to the cable and prevents it being communicated to cable interconnections within the housing. The clamp could, however, be used to retain together a bundle of cables, wires, hoses, ropes or the like, or to attach items to a cable or to other elongate members.

Various modifications are possible. For example, instead of making the clamp from plastics it could be made from an alternative material, such as metal.

The two parts of the clamp need not be identical, as shown in Figure 3, the two ratchet bars 111 could be provided on the same yoke 110, the other yoke 112 being bifurcated at both ends 113 and 114 to form two gaps 115 and 116 in which the ratchet bars are received.

The two parts of the clamp could be integral with cooperating parts of a connector or the like. As shown in Figure 4, one half 41 of a connector backshell housing 40 has two projecting ratchet arms 42 and the other half has two cooperating apertures 44 formed with ratchet teeth, which engage teeth on the ratchet arms. This arrangement reduces the need for a clamp separate from the backshell.

It will be appreciated that the clamp of the present invention could be modified in various ways. The ratchet bars and teeth, for example, could be any form of slider that allows movement in one direction but resists it in the opposite direction.

CLAIMS

1. A clamp for fastening about an elongate member the clamp comprising first and second yokes that can be urged together about opposite sides of the elongate member, two generally parallel ratchet bars extending between the yokes, and cooperating ratchet teeth so that as the two yokes are moved together in one direction the two ratchet bars move over the ratchet teeth to restrain the yokes against separation in an opposite direction.
2. A clamp according to Claim 1, wherein each yoke is formed integrally at one end with a respective ratchet bar and at its opposite end with ratchet teeth arranged to cooperate with the other ratchet bar.
3. A clamp according to Claim 2, wherein each yoke and its respective ratchet bar is identical with the other.
4. A clamp according to any one of the preceding claims, wherein the ratchet teeth are provided on a surface between two arms of the yoke extending laterally of the clamp.
5. A clamp according to any one of the preceding claims, wherein the yokes and ratchet bars are arranged such that they can be assembled or disassembled by relative movement laterally of the one direction.

6. A clamp according to any one of the preceding claims, wherein each yoke has an arched section for receiving the elongate member.
7. A clamp according to Claim 1, wherein one yoke is provided with both said ratchet bars and the other yoke is provided with two sets of cooperating ratchet teeth.
8. A clamp according to any one of the preceding claims, wherein the ratchet bars have ratchet teeth on two opposite surfaces.
9. A clamp according to any one of the preceding claims, wherein the yokes and ratchet bars are moulded from a plastics material.
10. A clamp according to any one of the preceding claims for clamping about one or more cables, and wherein the yokes are formed integral with cooperating housing parts of a connector.
11. A clamp including first and second clamping members, first and second unidirectional sliders extending parallel to one another at right angles to the clamping members, and first and second locations on the clamping members arranged to receive respective ones of the sliders in unidirectional engagement, wherein the clamping members and sliders therebetween defining an aperture for receiving a member to be clamped.

12. A clamp substantially as hereinbefore described with reference to Figures 1 and 2 of the accompanying drawings.
13. A clamp substantially as hereinbefore described with reference to Figures 1 and 2 as modified by Figure 3 of the accompanying drawings.
14. A clamp substantially as hereinbefore described with reference to Figures 1 and 2 as modified by Figure 4 of the accompanying drawings.
15. Any novel and inventive feature or combination of features as hereinbefore described.



INVESTOR IN PEOPLE

Application No: GB 0101350.7
Claims searched: 1-14

II Examiner: Phil Thorpe
Date of search: 9 February 2001

Patents Act 1977 Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK CI (Ed.S): E2A (AGH) ;

Int CI (Ed.7): F16L (3/10) ; F16B (2/12) ;

Other: Online : (WPI, PAJ, EPODOC) ;

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2128668 A (Blounthurst) - see for example figure 1.	1-3,5,6,8, 9-11
X	GB 1570820 A (Hilti) - see whole document.	1,6,7,9,11
X	GB 1396316 A (Tucker) - see for example figure 1.	1,5,7,9,11
X	WO 99/49253 A1 (Ultra-Frame) - see whole document.	1,6,7,9,11
X	CA 1255477 A (Clark) - see whole document.	1-3,5,6,8, 9-11
X	US 4202087 A (Wilderman) - see for example figure 2.	1,6-11

X Document indicating lack of novelty or inventive step
Y Document indicating lack of inventive step if combined with one or more other documents of same category.

& Member of the same patent family

A Document indicating technological background and/or state of the art
P Document published on or after the declared priority date but before the filing date of this invention.

E Patent document published on or after, but with priority date earlier than, the filing date of this application.